

CREDIT-BASED ADAPTIVE FLOW CONTROL FOR MULTI-STAGE MULTI-
DIMENSIONAL SWITCHING ARCHITECTURE

ABSTRACT OF THE INVENTION

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The novel credit-based adaptive flow control method and system for multi-stage, multi-dimensional, data switching architecture. The method and system of the present invention estimates and balances data flow in the switch architecture by using statistical information derived from the normal switching operation without requiring specific information from the previous stage. The multi-stage multi-dimensional switching architecture of the present invention includes three stages. The first and third stages are the buffering stages, and the second stage acts as a buffer-less crossbar switch node. Each stage includes an array of switching elements, and each element includes either a queuing processor or an arbitration processor arranged to progressively refine estimates of the data traffic from switch elements in the first stage by the second stage. The second stage maintains the statistic of valid traffic arrival and departure, and feedback grant information bit to the first stage. The first stage treats every grant information as credit for each data departure to the second stage, and sends the data if there is a grant credit available. The adaptive filtering process adjusts a threshold adaptively, rendering the statistical properties to resemble a chosen probability distribution.